PUBLIC SAFETY ANSWERING POINT (PSAP)
ANALYSIS REPORT

PREPARED FOR:

Bath County, Virginia

PREPARED BY:

TIMMONS

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SECTION 1 – INTRODUCTION

STATEMENT OF PURPOSE

Bath County relies upon centralized emergency response and dispatching to provide safety and security to it's citizens. In anticipation of growth, and the rapidly evolving communications technologies industry, Bath County, through the support of the Wireless E-911 Board, has chosen to work with ***TIMMONS*** to assess the County's current Public Safety Answering Point (PSAP) and provide recommendations to enable the processing of wireline E-911 calls.

In conducting this PSAP analysis and developing the resulting report and needs assessment, our ***TIMMONS***' team was driven by the following goals:

- Assess the PSAP in Bath County determining the type of hardware, software and network currently being utilized.
- Develop an appropriate network design for an enhanced 9-1-1 (E-911) system for Bath County to include customer premise equipment, ALI database services and any other hardware and software required.
- Determine the non-recurring, monthly recurring and life cycle costs for the E-911 system taking advantage of any existing infrastructure.
- Coordinate with the local exchange carriers serving Bath County in the development of the costs to ensure that the monthly recurring cost is kept to the minimum possible.
- Determine the level of additional funding support that could be provided by the Wireless E-911 Fund should Bath decide to implement wireless E-911 as well.

METHODOLOGY

This comprehensive Bath County PSAP Analysis Report represents the end result of numerous inter-related investigative tasks performed by ***TIMMONS*** and Bath County employees as part of a coordinated review and information gathering process. Each assessment task is summarized in the following bulleted list. Details are provided in the appropriate sections of the report.

INITIAL ORGANIZATIONAL MEETING – A ***TIMMONS***' representative held a meeting with key County Officials to develop a systematic approach to gathering the information necessary for this report. This meeting was conducted in an open manner providing dialogue that would allow the ***TIMMONS***' representative to determine the appropriate sources and contacts for obtaining information from within and outside the County organization. A comprehensive PSAP analysis Questionnaire was provided at this meeting for County Officials to review prior to conducting interviews.

PSAP QUESTIONNAIRE / INTERVIEWS – A PSAP Questionnaire was utilized in conducting interviews with the designated County Officials. The questionnaire and interviews were used as the primary data gathering tools. They focused on providing details of the County PSAP operation, key data resources and users, staffing levels and capabilities, and current PSAP equipment status. The questionnaire was completed during the actual interview, with subsequent follow-up by the County and TIMMONS staff.

INFORMATION EVALUATION – ***TIMMONS*** conducted an on-site inventory of the County's data sources identified during the Questionnaire / Interview process. The inventory focused on the PSAP capabilities and infrastructure. The information obtained through this process was then evaluated to determine the needs and related costs for this PSAP to meet current wire line standards. The results of the data gathering and processing efforts is a report of the current status and a set of recommendations for County mapping and addressing, PSAP equipment, networking, and staffing.

REPORTING AND PRESENTATION - Details of the current status and recommendations are provided to the County administration and the State Wireless Services Board through this report and a presentation to the County Board of Supervisors.

SECTION 2 – PSAP IDENTIFICATION

GENERAL INFORMATION

PSAP Name: **Bath County Sheriff's Office**

Address: **P.O. Box 218, Rt. 619, Courthouse Road**

City: **Warm Springs**

State: **Virginia**

ZIP Code: **24484**

Phone: **(540) 839-2375**

Fax: **(540) 839-3344**

Email: baso@tds.net

PSAP Contact: **Captain R.L. Armstrong**

PSAP Type: **Basic**

Coverage area: **Bath County**

Coverage exceptions: **none**

PSAP Government Structure: **Sheriff, County Board (subject to restructuring)**

LOCAL SERVICE PROVIDERS (LEC)

The local service providers in Bath County include **TDS Telecom, Mountain Grove-Williamsville (MGW), and CFW nTelos**.

TDS Telecom is the LEC serving the PSAP and Courthouse.

LEC Name: **TDS Telecom**

Local Contact Name: **James Carpenter**

Local Contact Phone: **(540) 839-2110**

TDS sales & engineering coordination contact information

Local Contact Name: **Steve Shanks**

Local Contact Phone: **(540) 864.7427**

WIRELESS SERVICE PROVIDERS (WSP)

Wireless services providers that cover all or part of Bath County include **Verizon-wireless** and **US Cellular**.

LEC Name: **Verizon-Wireless**

Local Contact Name:

Local Contact Phone:

LEC Name: **US Cellular (Wireless)**

Contact Name: **Charlotte Holden**

Local Contact Phone: **(773) 399-4836**

COOPERATING / COORDINATING AGENCIES

This is a listing of all external organizations with whom the Bath County PSAP has a working relationship. These organizations include private security, state agencies, etc.

Client: **The Homestead**
Contact Name : **Gary Rosenberg**
Phone: **(540) 839-2000**
Description of Relationship: This is a basic emergency call relationship whereas this private security client calls the PSAP through either the non-emergency line or 911-line dependant upon the nature of the call.

Client: **Virginia Hot Springs Land Development Company**
Contact Name : **Charles Adams**
Phone: **(540) 839-2899**
Description of Relationship: This is a basic emergency call relationship whereas this community security client calls the PSAP through either the non-emergency line or 911-line dependant upon the nature of the call.

Client: **US Forest Service**
Description of Relationship: This is a cooperating agency relationship in which these agencies work together as necessary via both telephone and radio communications but with no dispatching or related interaction.

Client: **Virginia Game Commission**
Description of Relationship: This is a cooperating agency relationship in which these agencies work together as necessary via both telephone and radio communications but with no dispatching or related interaction.

Client: **Bath County Animal Control**
Description of Relationship: This is a cooperating agency relationship in which these agencies work together as necessary via both telephone and radio communications but with the animal control officers being dispatched as necessary.

Client: **Virginia State Police**
Description of Relationship: This is a cooperating agency relationship in which these agencies work together as necessary via both telephone and radio communications but with no

dispatching or related interaction. Dispatching is handled via communication between their respective dispatch centers.

PRIMARY / SECONDARY PSAP INFORMATION

The Bath County PSAP is the only PSAP serving the County area. This PSAP provides basic 911 using a single handset with multi-line capability. No ANI/ALI or automated communications or dispatching capabilities exists today. No secondary or mobile PSAP backups or contingency plans exist today.

This PSAP operates on a 24/7 basis running 3 8-hour shifts. There are presently 17 employees in the Bath County Sheriff's Office consisting of 10 patrolmen, 6 dispatchers and 1 clerical. Designated officers are rotated in as dispatchers in the event of vacations or absence. All Sheriff's office employees in Bath County are sworn, uniformed law enforcement officers.

EMERGENCY SERVICES PROVIDERS

The following is a comprehensive list of emergency service providers within Bath County and dispatched by the Bath County PSAP.

Bath Highland Fire Department – Fire
Bath Highland Burnsville Substation – Fire
Mountain Grove – Fire (First responder)
Hot Springs Fire and Rescue – Fire and EMS
Millboro Fire Department – Fire
Millboro Rescue – EMS (First responder)
Dominion Power Rescue – EMS

All of these agencies are dispatched utilizing a general wall map and dispatcher familiarity with the area and service providers.

Dominion Power Rescue is dispatched by the Bath County PSAP only in the event of a call volume overflow or major disaster. They are not utilized for normal day-to-day calls.

SECTION 3 – OPERATIONS REVIEW

CALL VOLUME / EFFICIENCY ANALYSIS

The following table was designed to provide and organize information to measure both call volume and efficiency. This information will facilitate the recommendation of the optimum configuration of PSAP equipment based on accurate statistics. This information, however, is limited due to the fact that the Bath County PSAP currently utilizes minimal manual and no automated procedure designed to measure the information requested in this table.

The County utilizes voice recorders and keeps rough estimate of incoming calls to the PSAP. Based upon this count we estimate that the PSAP receives an average of 520 911 calls per month, 75 of these are Fire and Rescue calls the remainder are non-critical emergency calls. These call counts and estimations do not include mistakenly dialed calls to the PSAP.

Call Volume and Duration

Question	2001	2000	99	98
How many wireline 9-1-1 calls did your Primary PSAP (s) directly receive?	***6240***			
How many wireline 9-1-1calls did your Primary PSAP (s) receive by transfer in? (calls transferred from administrative lines, 3-1-1, telephone operators, etc.)	*N/A*			
How many wireless/PCS 9-1-1 calls did your Primary PSAP (s) receive?	*N/A*			
What is the total number of 9-1-1 calls your Primary PSAP(s) received?	***6240***			
How many non-emergency 9-1-1 calls did your Primary PSAP(s) receive?	***5340***			
How many other calls (non-9-1-1) did your Primary PSAP(s) receive?	*N/A*			
What was your average answer time for 9-1-1 emergency calls in 2001?	*N/A*			
What was your average answer time for 9-1-1 non-emergency calls?	*N/A*			
What was your average answer time for 9-1-1 calls that resulted in dispatch?	*N/A*			
What was your average call length time (in seconds) for wireline emergency calls?	*N/A*			
What was your average call length time (in seconds) for wireline non-emergency calls?	*N/A*			
What was your average call length time (in seconds) for wireline calls that resulted in dispatch?	*N/A*			
What was your average answer time for 9-1-1 emergency calls in 2001?	*N/A*			
What was your average call length time (in seconds) for wireless emergency calls?	*N/A*			

CALL ROUTING / DEFAULTS

The following table was designed to organize information relevant to the Bath County PSAP's current call routing capabilities and functionalities.

Call Routing/Defaults	
Question	**Response**
Direct PSAP Calls	*Yes*
PSAP System Type	*Dedicated phone*
CLEC calls routed the same	*N/A*
PSAP Overflow No	*1 overflow line*
Default ESN	*N/A*
Operator (Dial 0 No)	*N/A*
ANI Failure	*N/A*
ANI Failure Other	*N/A*
Secondary PSAP Name	*N/A*
Secondary Overflow No	*N/A*
Trunking to PSAP or TANDEM	*Two dedicated 911 lines*
PSAP Database	*N/A*
Outside Party Name	*N/A*
Site Visit	*N/A*
Call Routing Comments	*N/A*
Contract Required	*N/A*
Contract Comments	

Currently 911 calls are received via dedicated lines through a Centrex phone system provided by TDS Telecom. There is one phone in the dispatch center, which supports the following services:

- 3 outside lines
- 1 inter-office line
- 2 911 lines (1 plus a rollover line)
- Individual caller ID box for each 911 line

The caller ID units are utilized on this single phone for caller identification. Citizens call the PSAP by dialing 911 and are then routed by the LEC equipment to one of the 2 dedicated 911 lines. The dispatcher queries the caller to determine the nature of the emergency and dispatches the appropriate emergency service provider(s) via radio.

SECTION 4 – EQUIPMENT ANALYSIS

LEC EQUIPMENT

TDS telecom is the sole local service provider to the PSAP, Courthouse complex, and Sheriff's Office. TDS Telecom provides the PSAP and Sheriff's Office, with 6 standard business lines. Two of these lines dedicated to 911 calls with one of them serving as a rollover line.

The County currently pays a monthly fee to each of the four LEC service providers for switching of incoming 911 calls to the 7 digit 911 lines.

Telecom connectivity to the PSAP will be provided by TDS through tandem CAMA trunk lines from the Warm Springs CO. The CAMA trunk lines are an industry standard and will work with all the major PSAP equipment vendor's products.

TDS Telecom currently uses a Lucent Technologies 5E switch that does provide the capability of facilitating 20 digital ANI protocols.

PSAP EQUIPMENT - INTERFACES

The following table illustrates that the only equipment interfaces that are currently in place or available exists between the Centrex telecommunications equipment, provided by TDS Telecom, and a Dictaphone Voice Recorder owned by Bath County and TDD/TTY equipment.

This Dictaphone records all call, incoming and outgoing, which are transmitted over the 2 designated 911 lines. This system is the only equipment interface, automated or otherwise, that currently exists in the PSAP.

The TDD/TTY owned by the County is available for use with the current phone system but is not integrated into the daily operations of the call center. This equipment is implemented as necessary.

PSAP EQUIPMENT - INTERFACES		
Equipment	**Provider/ Manufacturer**	**Description (include version, model, or identifying numbers etc..)**
Trunk interface		*NONE*
Central Office based interface		*NONE*
ALI database interface		*NONE*
CAD Interface		*NONE*
Recorders and Teleprinters interface	*Dictaphone*	*Voice recorder*
ANI display interface		*NONE*
ALI display interface		*NONE*
PSAP time synchronization interface		*NONE*
Remote data transfer interface		*NONE*
Telephone analog audio interface		*NONE*
Radio/Telephone headset interface		*NONE*
Off-hook signal contact pairs		*NONE*
Handset/headset interfaces		*NONE*
PBX/Automatic Call Distribution (ACD) interface		*NONE*
PSAP Alarms		*NONE*
TDD/TTY interface		*Available but not utilized full time*

PSAP EQUIPMENT – COMMUNICATIONS EQUIPMENT / FEATURES

The following table illustrates the capabilities of the existing phone system utilized by the PSAP. There is presently one dispatch station utilizing a Centrex System provided by TDS Telecom. This phone operates from one trunk line, and has the following:

- 3 outside lines
- 1 inter-office line
- 2 911 lines (I plus a rollover line)

SECTION D – NETWORKING / COMMUNICATIONS	
D.2 – Telecommunications	
Question	**Response**
What type of phone system do you currently have?	*Centrex – TDS Telecom*
Are you using a PBX?	*No*
What type of voicemail system do you have?	*Centrex voice mail*
Is the voicemail system centralized?	*Yes*
How many telephone sets do you use?	*1 in PSAP*
What is the anticipated growth if any?	*1 additional in PSAP*
Does each telephone have Direct In Dialing?	*Yes, as well as Internally dialed extensions*
Do you have fax machines or modem lines?	*Yes, 1 in PSAP*
Are the fax/modem lines POTS lines or do they go through your phone system?	*POTS*

COMMUNICATIONS FEATURES		
Feature	**Availability**	**Description**
Attendant Position Compatibility		*N/A*
Queuing of 911 calls		*Manual / Visual*
Distinctive ringing		*N/A*
Ring back		*N/A*
Hold for emergency calls		*Occasionally*
Hookflash		*N/A*
Audi volume adjustment		*N/A*
Three-way conferencing / transfer		*N/A*
Speed dialing		*N/A*
Last number redial	*yes*	*Available*
Trunk or line access		*Single Trunk / Multi-line access*
Public switched access line		*No rollover*
PSAP login ID		*N/A*
PSAP status indicators		*N/A*
Barge in		*N/A*
Headset/handset compatibility		*N/A*
TDD/TTY compatibility	*yes*	*Available*
Management Information Sys.		*N/A*
Multiple ALI databases		*N/A*
Other features (list & describe)		*N/A*

Radio Equipment

The radio communications equipment utilized by the PSAP consists of 3 independent radio systems. Mountain Electronics, Inc provided all of these radio systems at different periods in time. The systems are not compatible with each other. Therefore the dispatcher must utilize each system to dispatch the respective emergency service provider. An integrated radio system that provides services to all EMS providers is recommended. Detailed specifications for the radio system are beyond the scope of this report. These are described as follows:

Sheriff's Department – This is a Kenwood mobile (TK-880), with a UPS power supply and a repeater, also a Kenwood, which is located on the BARC site in WV on Springs Mt. The frequency is 453.650/458.650 mHz.

Fire and Rescue – This is a Kenwood mobile as well, also on a UPS power supply, with a CSI PE-1000D paging encoder hooked to it. This system utilizes 2 repeaters (also on BARC site), one for the fire department at a frequency of 460.525/465.525 mHz and one for the rescue squad at a frequency of 463.475/468.475 mHz.

Mountain Grove / Dominion Power – This system serves only these 2 entities and operates on a Motorola Lo-Band System. The frequency information was unavailable, but it is possibly 39.50 mHz.

PSAP EQUIPMENT - POWER

A 45,000 W Propane Generator backup power supply, owned by Bath County, serves the PSAP, along with the entire Sheriff's office. This unit has a fully automatic startup in case of power outage or even brown outs. This unit serves as backup for all equipment in the Sheriff's office including the VCIN, FLOWS, and radio equipment. We anticipate that this backup unit will be sufficient to provide reliable backup power to the PSAP CPE and networking in the event of an extended power outage.

POWER EQUIPMENT

Type	Provider/ Manufacturer	Description
Commercial Power		*BARC Elec. Coop - Millboro*
Reserve Power		*45 KW propane generator*
Emergency Power		*********
Transient Voltage Surge Suppression (TVSS)		
Comments		** UPS also on VCIN & *FLOWS*

PSAP EQUIPMENT – MAINTENANCE AND ADMINISTRATION

The only equipment in the Bath County PSAP that has a formal maintenance and support contract is the VCIN criminal records information network provided by the Virginia State Police that is backed by a guaranteed 4-hour response time. No other equipment has a support and maintenance contract.

SECTION 5 – NETWORKING / COMMUNICATIONS ANALYSIS

INTERNAL NETWORKING

There is a Client-Server network in place in the Courthouse Building serving 13 users. **The Sheriff's Department, and the PSAP are not a part of this network**. All Stations located in the Sheriff's office are stand-alone.

It is anticipated that the future County GIS will use the Courthouse Building network. The GIS will be the source for addressing and background data to support wireless Phase II E-911 calls. Data transfer between the GIS and the PSAP will need to be established to provide mapping support. This can be done through periodic manual data transfer or through a networking connection that bridges the two networks. Details and specifications of the network bridge requirements are beyond the scope of this report and should be considered as part of the wireless Phase II development effort.

The Courthouse network is served through a 15 port hub and utilizing CAT5 cabling. Bright and Associates installed the Network approximately 4-5 years ago and the cabling was installed by County employees. Bright and Associates did not provide detailed information on the network specifics, but limited information is available in the table below. Descriptions of individual stations are provided in the Networking / Computer Equipment Section to follow.

There is no centralized email for the County. There are 3 e-mail addresses provided to the county be the local ISP. The County Administrator, Commissioner of Revenue, and the Treasurer use these addresses. All other County Officials use hotmail or similar accounts. Internet access is provided via a share 56k dial-up connection through the server. The County currently has no dedicated email server. The County does, however have a server and could potentially facilitate centralized email for County employees, but the necessary IT skills for administering these types of services does not exist within the current staff.

Bath County officials are currently working with the Virginia Department of Information Technology to implement COVANET high-speed access, web-hosting, and email services for the County. This implementation will greatly improve internet communications for the County.

INTERNAL NETWORKING	
Question	**Response**
How many users does the PSAP have?	*No PSAP stations, 13 CH users, 6 stand alone*
What is the anticipated growth of users?	*3-5 additional*
Are these users connected via a network?	*Courthouse has network, none other present*
If yes, what type of networking topology? *(Peer-to-Peer /Client-Server)*	*CH – client server*
What type of cabling? *(ethernet-CAT5)*	*CAT5*
What types of computers do your users have? (include make, model, RAM, processing power, operating system, NICs /speed)	*See Networking Equipment Section*
Do you have a server? *(If yes, what is the make, model, RAM, processing power, operating system, NIC speed?)*	*CH - yes*
Do you have antivirus software on you computers? *(If yes, list type)*	*Yes, independent on each machine*
Do you perform any backup? *(If so, what type of hardware and software do you use)*	*No central file storage used* *Backup only for payroll*
How many printers do you have?	*See Networking Equipment Section*
How are the printers shared by your users?	*All printers in CH network are shared*
Do you have e-mail? *(If yes, what is the client (Outlook?) and server (Exchange))*	*Adm., Treas. COR, TDS. Others independent* *Server exist, but IT skills are needed*
Do you have an AS400 system? *(If yes, please describe)*	*Yes, running Bright & Assoc County Mgt. Software*

D.1 – Internal Networking (*continued*)	
Question	**Response**
What types of applications do you run/will you be running in this office? *(Microsoft Office Suite, AS400 terminal emulator)*	*See Software Competencies Section*
Do you have a firewall? *(If yes, what kind)*	*No*
Do you have any hubs/switches/routers? *(what are the makes/models/speeds)*	*Yes, 1 hub*
Do your users have internet access? *(If yes, what type, how many, connection type .. ie..dialup/cable/modem/ISDN?/T1)*	*Yes, through a shared 56K modem*
How many buildings make up the location?	*5*
Will you be adding buildings in the future?	*1 (school board)*
What is their geographic location to one another?	
Are they connected via the network? *(describe)*	*No*
Are you connected to other government offices? If yes, who and where are they located? If no, are there any you foresee needing communication with in the future	*Dial-up to Transfer Station, Recreation Department, and the Animal Shelter*
Are you connected to any outside clients? If yes, who?	*Connected to DBM – Raleigh, NC*
What type of phone system are you running? (Vendor)	*TDS Telecom - Centrex System*

NETWORKING / COMPUTER EQUIPMENT

The following is a list of all networking/ computer related equipment utilized within the County Government of Bath County. The equipment has been listed by location, including the Sheriff's Office which is a separate facility located in the Courthouse Complex.

Sheriff's Office Equipment

Department: **Bath County Sheriff's Office (PSAP / Dispatch)**
Computers: **Bull – VCIN PC (VA Criminal Information Network) (stand alone),**
Dell – IFLOWS PC (Rainfall monitoring) (stand alone, but used for clerical tasks)
Printers: **HP 6L laserjet, Epson printer (VCIN)**
Other Equipment: **Brother intellifax**

Department: **Bath County Sheriff's Office (Administration)**
Computers: **IBR PC (stand alone)**
Printers: **None**
Other Equipment: **None**

Department: **Bath County Sheriff's Office (Media Room)**
Computers: **Dell PC (stand alone, w/ dial-up internet access)**
Printers: **None**
Other Equipment: **None**

Department: **Bath County Sheriff's Office (Training Room)**
Computers: **Dell PC (stand alone, w/ dial-up internet access)**
Printers: **None**
Other Equipment: **None**

Department: **Bath County Sheriff's Deputies**
Computers: *** Each field officer has a laptop PC with one additional pc available as a floater**
Printers: **None**
Other Equipment: **None**

Courthouse Equipment

Department: **Planning / Zoning**
Computers: **Dell dimension**
Printers: **HP6 laser jet**
Other Equipment: **MITIA DC3055 copier**

Department: **Building Official**
Computers: **Cybermax 333**
Printers: **HP6L laser jet, HP Officejet**
Other Equipment: **None**

Department: **Building & Grounds / EMS Coordinator**
Computers: **Gateway (IFLOWS, w/state rainfall monitoring PC)**
Printers: **HP Deskjet**
Other Equipment: **None**

Department: **Commissionerof Revenue's Office**
Computers: **Systemax PC 333, Compaq Presario PC, Compaq A1500 (all tied into DMV)**
Printers: **HP Officejet, HPDeskjet 612**
Other Equipment: **None**

Department: **Treasurers Office**
Computers: **Systemax PC, Cybermax PC, DMV mainframe, 3 Micron Dumb Terminals**

Printers: **2 Brother Lasers**, **2 Lexmark Optima Printers, 3 Lexmark Form Printers, IBM Form Printer, HP 612, HP Laserjet 6L**
Other Equipment: **None**

Department: **Server Room**
Computers: **IBM server (installed in 2001)**
Printers: **None**
Other Equipment: **15 Port Hub (located next door in Voter Registration)**

Department: **County Administration**
Computers: **2 Dell PCs, Gateway PC**
Printers: **IBM Form Printer, HP officejet, 2 HP 6Ls**
Other Equipment: **None**

Off-site Equipment

Department: **Solid Waste Transfer Station**
Computers: **Cybermax PC**
Printers: **Okidata Dotmatrix Printer**
Other Equipment: **None**

Department: **Bath County Animal Shelter**
Computers: **Cybermax PC**
Printers: **HP 6L laserjet**
Other Equipment: **None**

Department: **Bath County Parks and Recreation**
Computers: **Gateway PC**
Printers: **HP Laserjet 6P**
Other Equipment: **None**

EXTERNAL NETWORKING

The only dedicated external networking existing within the County Offices, including the PSAP is the dedicated connection used for the VCIN System. All other external access is done by an on demand dial-up access.

EXTERNAL NETWORKING	
Question	**Response**
How is the PSAP connected to the outside?	*VCIN only*
Who is providing connectivity? (Verizon, etc.?)	*TDS Telecom (VA State Police)*
How many lines are coming in?	*1*
What is anticipate growth/pressure on the systems usage in the future?	*NONE*
Is there any redundancy in place for the system? (backup lines, backup providers, backup power)	*NONE*
Where is the redundancy located in relation to the primary access? Is it in a separate geographic location?	*NONE*

SECTION 6 – SOFTWARE / DATA ANALYSIS

SOFTWARE COMPETANCIES

The following table illustrates the software packages currently being utilized in the County and provides some insight into the skill sets and level of comfort that each department has with their respective applications.

SOFTWARE COMPETENCIES

Software	Dept.	Application Usage	Staff Proficiency
Microsoft Office 95	*Animal Ctrl*	*Win., Excel, Publishers, Money*	*Novice*
Norton Antivirus 95	*Animal Ctrl*	*Anti virus*	*Novice*
Reflections	*Animal Ctrl*	*AS400 (Bright)*	*Intermediate*
Microsoft Office 95	*Parks/Rec.*	*Spread sheet, data base*	*Novice*
Microsoft Office 95	*Parks/Rec*	*Word processor*	*Novice*
Norton Utilities 2000	*Parks/Rec*	*Anti virus*	*Novice*
MS Internet Explorer	*Parks/Rec*	*Reader for internet*	*Intermediate*
Microsoft Office 2000	*Cnty Admin.*	*Word, Excel, Publisher, Power Point, Access*	*Intermediate*
Norton Utilities 2000	*Cnty Admin.*	*Anti virus*	*Novice*
Reflections	*Cnty Admin.*	*AS400 (Brights)*	*Intermediate*
ACH	*Cnty Admin.*	*Direct deposit – banking*	*Intermediate*
Microsoft Office 2000	*Treas.*	*Word, Excel, PowerPoint, Access, Publisher*	*Novice*
Norton Utilities	*Treas.*	*Anti virus*	*Novice*

SOFTWARE COMPETENCIES (continued)

Software	Dept.	Application Usage	Staff Proficiency
Reflections	*Treas.*	*AS 400 (Bright)*	*Intermediate*
Reflections	*COR*	*AS400 (Bright)*	*Intermediate*
ATX	*COR*	*Tax forms & submissions*	*Intermediate*
Microsoft Office 2000 & 97	*COR*	*Word, Excel, Publisher*	*Intermediate*
Norton Utilities 2000	*COR*	*Anti virus*	*Novice*
Microsoft Works	*COR*	*Spread sheets, Word Processor. Data base*	*Novice*
Microsoft Office 2000	*BPZ*	*Word, Excel, Publisher, PowerPoint, Access*	*Intermediate*
Corel Site 97	*BPZ*	*Word Perfect, Presentations, QuatroPro*	*Intermediate*
Microsoft Suite	*BPZ*	*Photo Deluxe*	*Novice*
3D Topos	*BPZ*	*Topo Quad Maps*	*Novice*
Reflect System	*BPZ*	*Solid Waste Bills*	*Novice*
Norton 2000	*BPZ*	*Anti virus*	*Intermediate*
Reflections	*BPZ*	*AS400 (Brights)*	*Intermediate*
Microsoft Office 2000	*PSAP*	*Reports, etc.*	*Intermediate*
IFLOWS	*PSAP*	*Rainfall Monitoring*	*Intermediate*

The Software Competencies chart above illustrates Bath County's need for advanced level IT skills.

DATA INFORMATION

In gathering information on the various data sets available in Bath County, we have addressed several data types and sources including both geographic and non-geographic data. **It is important to note that there is presently no uniform structure addressing within the County. This need will be discussed further in Section 7 – Recommendations – Mapping / Addressing.**

The following table gives a description of the non-geographic data that exists and is utilized in the daily operations of the County. You may note that some data sets are repeated in the table to distinguish usage by different departments.

EXISTING NON-GEOGRAPHIC DATA								
Data Name	**Type (Format)**	**Dist. Method**	**Description** (include accuracy / scale information)	**Data Steward / Department**	**Create**	**Edit**	**View**	**Freq. of use**
Building Permits	*XLS*	*Copy*	*Spreadsheet*	*BPZ*	*x*	*x*	*x*	*Daily*
DMV	*AS400*	*Shared*	*Personal prop.*	*COR*	*x*	*x*	*x*	*Daily*
Real Estate	*AS400*	*Shared*	*Real estate taxes*	*COR*	*x*	*x*	*x*	*Daily*
Personal property	*AS400*	*shared*	*Personal property taxes*	*COR*		*x*	*x*	*Daily*
IMS(tax)	*AS400*	*Shared*	*State taxes*	*COR*		*x*	*x*	*Daily*
DMV	*Ind.*	*Shared*	*Car tags*	*Treas.*		*x*	*x*	*Daily*
Real estate	*AS400*	*Shared*	*See above*	*Treas.*		*x*	*x*	*Daily*
Personal prop	*AS400*	*Shared*	*See above*	*Treas.*		*x*	*x*	*Daily*
IMS	*AS400*	*Comp Board*		*Treas.*		*x*	*x*	*Daily*
Dept. of Taxation	*Int.*	*Shared*	*State taxation*	*Treas.*		*x*	*x*	*Daily*
Accts. Payable	*AS400*	*Shared*	*Billing*	*Cnty Admin.*	*x*	*x*	*x*	*Daily*
Payroll	*AS400*	*Shared*	*Employee payroll*	*Cnty Admin.*		*x*	*x*	*Daily*
DMV	*AS400*	*Shared*	*SNIPS*	*Cnty Admin.*		*x*	*x*	*Daily*
AS400	*AS400*	*Shared*	*Dog/cat licenses*	*Animal shelter*	*x*	*x*	*x*	*Daily*

The following table gives a description of the geographic data (GIS) that exists and is utilized by the County. The primary user of this data is the Building/Planning/Zoning Office. Bath County is currently under contract with a vendor to provide digitized parcel information and other data layers as indicated in the tables below. All digital geographic data is being developed in a native ESRI GIS format. The "status" field in the table below is abbreviated as follows:

V– Being Supplied by the vendor
N - Needed
X – Not needed

GEOGRAPHIC DATA (GIS)			
Map Feature	**Status**	**Map Feature**	**Status**
Real Property Features		***Environmental / Topographic Features***	
▪ Building Footprints	***N***	▪ 5 – foot Contour Intervals	***V***
▪ Parcels	***V***	▪ 10 – foot Contour Intervals	***V***
▪ Publicly-owned Property	***V***	▪ Environmentally Sensitive Areas	***V***
▪ Rights-of-way / Easements	***N***	▪ Hazardous Waste / Materials Locations	***N***
▪ Other (specify)		▪ Hydrography (rivers, lakes, streams, etc.)	***V***
▪ Other (specify)		▪ Soils	***V***
▪ Other (specify)		▪ Wetlands	***V***
		▪ Other (specify)	

Map Feature	Status	Map Feature	Status
Environmental / Topographic Features (cont.)		**Utility Infrastructure Features (cont.)**	
▪ Other (specify) caves /sink holes	**V**	▪ Service / Franchise Area Boundaries	***N***
▪ Other (specify)		▪ Sanitary Sewer Facility Features (pipes, manholes, pump stations, treatment plants, etc.)	***N***
Public Safety Features			
▪ Access Point Locations	***N***	▪ Storm Sewer Facility Features (pipes, culverts, catch basins, outlets, pump stations, etc.)	***N***
▪ Emergency Service Zones	***N***		
▪ Hazardous Materials Locations	***N***	▪ Water Facility Features (pipes, tanks, valves, hydrants, meters, pump stations, treatment plants, etc.)	***N***
▪ *Impedance Locations*	***N***		
▪ Incident Locations	***N***		
▪ Mutual Aid Boundaries	***N***	▪ Watersheds	***V***
▪ Public Safety Answering Point Boundaries	***N***	▪ Other (specify)	
▪ Police (Sheriff) Districts / Precincts / Beats	***N***	▪ Other (specify)	
▪ Structure Addresses / Locations	***N***	▪ Other (specify)	
▪ Other (specify)		**Public Works Infrastructure Features**	
▪ Other (specify)		▪ Bike Lanes	***X***
▪ Other (specify)		▪ Bridges	***V***
***U*tility Infrastructure Features**		▪ Bus Stops / Stations	***X***
▪ Drainage Basins	***N***	▪ Cross Walks	***N***
▪ Pressure / Service Zones	***N***	▪ Over / Under Passes	***N***
▪ Pressure Contours	***N***	▪ Pavement Edges	***V***

Map Feature	Status	Map Feature	Status
Public Works Infrastructure Features (cont.)		**Other Mapping Features (cont.)**	
❑ Pavement Markings	***N***	❑ Industrial / Commercial Properties	***V***
❑ Pavement Types	***N***	❑ Land Use Plans	***V***
❑ Railroad Stations	***N***	❑ Zoning	***V***
❑ Street Signs	***N***	❑ Geodetic Control Survey Points	***X***
❑ Traffic Signals	***N***	❑ Transportation Plan	***X***

❑ Tunnels	***N***	❑ Water Emergency Ordinance Locations	***N***
❑ Other (specify)		❑ Emergency Evacuation Routes	***N***
❑ Other (specify)		❑ Aerial Photography / Satellite Imagery	***VBMP***
❑ Other (specify)		❑ Other (specify)	
Other Mapping Features		❑ Other (specify)	
❑ Subdivisions / Neighborhoods Boundaries	***V***	❑ Other (specify)	
❑ County / City / Township Boundaries	***V***		

The following table was taken from the Bath County Comprehensive Plan gives a description of the geographic data (GIS) that exists and is utilized by the County. The primary user of this data is the Building/Planning/Zoning Office. Bath County is currently under contract with Anderson and Associates to provide digitized parcel information

MAPS FOR BATH COUNTY COMP PLAN

SECTION	MAP TITLE	SOURCE	DATA SOURCE CONTACT	NOTES
History	Location of Historic Sites	V1-13	Bath Historical Society	
Natural Env.	Relief Map	V1-77	NA	
Natural Env.	Generalized Slope (>25%)	V1-79	NA	
Natural Env.	Generalized Geologic Map	V1-85	NA	
Natural Env.	Cave and Sinkhole Distribution	V1-93	NA	
Natural Env.	Generalized Soils	V1-97	NA	
Natural Env.	Agricultural Suitability	V1-103	NA	
Natural Env.	Septic Tank Suitability	V1-109	NA	
Natural Env.	Major Springs and Wells	V1-111	Bath County Service Authority	
Natural Env.	Major Watersheds	V1-115	Bath County Service Authority	
Natural Env.	100-Year Floodplain	V1-117	FEMA digital	
Natural Env.	Primary Classification-Water	V1-121	NA	
Natural Env.	Public Lands	V1-151	Park/Forrest Service digital?	
Transport.	Highway Network	V1-157	VDOT	
Transport.	Traffic Volume	V1-161	VDOT	
C. Facilities	Fire Co. Locations	V1-189	Bath County Emergency Services	
Utilities	Power Co. Service Areas	V1-171	BARC Electric Cooperative	
Utilities	Major Power Trans. Lines	V1-173	BARC Electric Cooperative	
Utilities	Areas served by 12.5 KV	V1-175	BARC Electric Cooperative	

Utilities	Avail. of Power for Industry	V1-179	BARC Electric Cooperative	May be able to consolidate some of these 4 maps
Utilities	Major Water Systems	V1-195	Bath County Service Authority	
Utilities	Wastewater Treatment Facils.	V1-201	Bath County Service Authority	
Land Use	Agricultural Suitability Public Lands Generalized Slope (>25%) 100-Year Floodplain Cave and Sinkhole Distrib. Major Water Systems Wastewater Treatment Facils. Generalized Soils			These 8 characteristics will be layered to show developable land (color gradation map)

SECTION 7 – RECOMMENDATIONS – MAPPING/ADDRESSING

INTRODUCTION

Accurate mapping is the foundation upon which successful E-911 addressing programs are developed. Data collected for E-911 addressing purposes needs to be accurate with respect to the underlying road network, the Virginia State Plan Coordinate system and other base mapping data. This insures that the addressing will make sense to the emergency service responder using the road network or air transport. It will also enable the accurate update and addressing of roads and structures as they are built.

The addressing system established for Bath County must take into consideration the location and value of existing addresses that will not change. In most cases, the County has existing addressing in place that will not be changed. Accurate field location and identification of the existing addressing is crucial for developing the County-wide addressing schema. Additionally, all structures within the County must be field evaluated to determine if they are or can be places where citizens live, work, play or worship. This is difficult if not impossible to determine from digital imagery alone. The preferred approach incorporates traditional base mapping components (imagery and Planimetrics) and Global Positioning Systems (GPS) Technology.

Public Information / Education / Outreach

It is essential that key stakeholders and the public are kept aware of the project progress and expectations. This greatly increases the public participation when providing old address information. It also decreases the number of complaints and questions fielded by the County Board and staff.

A properly implemented public information and education campaign should be integrated throughout the entire project process. Prior to the launch of major project events such as field verification and address delivery, local newspapers and radio should be provided with informational pieces designed to inform the public of what the current status of the project is, and what is required of them to make the implementation successful. Additionally, the County should plan for coordination meetings with the LECs and Postal Service to keep them informed of the project progress and requirements.

Data Development Options

Two sources of data are generally used for development of base data to support E-911 and addressing; digital imagery and GPS field data collection. These are complimentary data sources and can be used together or as stand-alone sources.

GPS derived data provides very accurate location information for road centerlines and structures. This provides a great road network to serve as addressing base. Under any collection approach field operators must visit the structures to determine the habitability of each structure. When outfitted with GPS units, address verifications teams can accurately

locate the structure, driveway and where the driveway meets the addressing road. This eliminates the need, cost and potential mistakes of tracing the roadway and structure locations from imagery.

Aerial photography can be ortho rectified into digital ortho imagery to provide a spatially accurate digital picture of structures and roads. This provides a nice background picture for GIS development. When used with GPS derived data it is loaded into the GPS data collector and enables the user to see which dirt roads lead to structures. When used alone, road centerlines and structure locations can be traced over the image on the computer. Field verification is then required to evaluate each structure for habitability.

Typical Rural Wireline Mapping and Addressing Deliverables

The typical scope of services for the successful and timely implementation of a Wireline E-911 project within a rural Virginia County incorporates the following elements:

- Acquisition of Digital Orthophotography from the Virginia Base Mapping Program (VBMP)
- Roadway centerline and structure database development. Digital mapping files of all addressed roads and structures compatible with Bath County's proposed PSAP equipment and planned GIS capabilities
- Development and administration of a Public Information / Education Program to support the road naming, addressing, and citizen notification processes
- Development of an addressing system to be used for the assignment of locatable addresses to all habitable structures and roadways within Bath County
- Coordination of addressing services (old / new matches) with the local telephone companies (LECs) and the various County post offices
- Development of Ordinances to support initial and ongoing addressing and street naming within the County.
- Citizen notification of new road names and assigned E-911 addresses
- Development of a County-wide Master Street Address Guide
- Development of address maintenance applications suitable for the assignment of new structure / roadway addresses within Bath County's resulting E-911 maintenance GIS environment

BASE Data Development

Digital Orthophotography (VBMP)

Bath County's Wireline E-911stands to benefit greatly from the Virginia Base Mapping Programs, Virginia Geographic Information Network's (VGIN) state-wide digital ortho-photography base map product (currently under development), as the basis for developing the County's E-911 Mapping and Addressing Program and associated mapping products. The VBMP imagery was flown in February and early March of 2002. Processing will begin in the summer of 2002 and delivery is scheduled to begin in the February/March timeframe

of 2003. Imagery covering Bath County is 1"=400' (1:4800) Scale, which is more that sufficient for the development on needed base layer features.

Color digital orthophotography will add value to the County's planned mapping and addressing program by delineating the planimetric and topographic features required to derive and interpret spatial relationships between structures and road features. It is strongly recommended that the County rely on this data for the development of the road centerlines and planimetric features required to support E-911 Addressing and Mapping components of Bath's E-911 needs, as well as future needs relative to resolving wireless caller locations.

Office Data Development

Utilizing the VBMP Orthophotography, Initial data layers can be developed in a GIS environment using "heads up" screen digitizing. The VBMP includes hydrographic (water) features, which are an integral component to the E-911 map books that are typically desired for response vehicle use. Additionally, features such as roads, long driveways, structures, and other visible features can be collected in a cost effective manner using this approach.

Field Component

A typical approach to augmenting the base layers is to utilize GPS technology integrated with GIS databases. Digital orthophotography and GIS feature layers are loaded into mobile units and used to guide the progress and confirmation of the existence of addressable structures. A standard approach involves a verification crew driving all public and private roads in the County to collect structure location and attribute information, with the objective of making a determination of structure function and existence of wireline phone service. In cases where the structure access point is not adjacent to the house, access point and the structure locations are collected and correlated. Additionally, location and attribute information on payphones and communications towers are also required to be collected. The result of this process will be spatially accurate road centerlines, structures, payphones, and communication towers along with attribute information that fits with the orthophotography.

Through the use of GPS, accurate (sub-meter) road centerline, building, driveway, pay phone, fire hydrant, and other pertinent landscape feature locations can be identified within a very short time frame. Since these features are being field collected, as opposed to picking them from two-dimensional aerial images, this approach enables field verification of:

- Posted addresses (rural route and house number)
- Structure type (single family, multi-family, modular home, office, retail, etc.)
- Structure features (material of construction, color, number of stories, etc.)
- Free standing and co-located pay phones
- Communications towers

Descriptive structure data (type, color, material) collected during the field mapping / verification process will prove valuable to the County's Emergency Service Responders. This information can is typically considered an additional option.

Road Naming and Private Roads

The County requires official naming of both public and private roads in order to assign official E-911 addresses to its citizens. The County should note that the process of formally naming roads can be both time consuming and politically charged. In consideration that Bath County went through the process of reassignment of road names, every possible consideration will be given to preserving these names, as allowable within recommended road naming standards.

The process usually benefits greatly from the development of an initial road map that completely inventories all public and private roads mapped within the County. This map product will support the County's road naming process. As the subject roads are named, we will update our GIS mapping database to reflect these changes.

Since it is standard practice to assign a private road classification (and associated name) to all driveways that provide access to three or more habitable structures, we anticipate identifying additional private roads during the course of the mapping process. Unnamed private roads are typically given a unique identifier, and the mapped location and list of these unnamed private roads should be provided to the County to facilitate the naming process.

ADDRESS DEVELOPMENT

The addressing component of Bath County's E911 Program is a critical element that requires adequate planning and careful implementation. Due consideration should be given to all addressing systems that have been previously implemented in neighboring counties. Address assignment and notification tasks should only occur once. To have to go back and change addresses once they have been assigned is a costly mistake that will very quickly result in dissatisfied and uncooperative citizens.

If desired by the County, the selected addressing system should also take into consideration and be worked around any existing addresses that have already been assigned (either by the County or residents) whether or not these addresses fit the selected addressing model.

Rural Address Development can be summarized within the following tasks:

Address System Development

Evaluation of a variety of addressing models and select the one best suited for Bath County based on a number of criteria including, terrain, prevailing road geometry characteristics, existing adjacent addressing systems, previously assigned County addresses (if any), etc. Any recommended system should fully explain any resulting intricacies prior to initiating the address assignment process. Regardless of the final selected addressing system, an allowance must be made to account for the future assignment of addresses within the resulting ranges.

Roadway Addressing

Address ranges (low right, high right, low left, high left) will be assigned as attributes to each road centerline feature. Address range assignments will vary depending upon the selected

structure addressing method. The assignment of address ranges to the road centerline GIS features supports the GIS software's ability to interpolate addresses based upon a selected location along any given centerline. Such functionality is required to support the County's desired dispatching, routing, and address assignment applications.

Structure Addressing

Structure addresses should be assigned based upon the location of their associated access points along the roadway. It is especially important to assign addresses based upon the access point locations, as opposed to the structure locations, in instances where:

- The structure is not readily seen from the roadway (as in cases with long driveways or secluded structures)
- The distance between the structure and the roadway is such that rapid / accurate identification from the roadway is not easily achieved
- The distance between the structure and its access point location is such that a rapid / accurate association between the two is not easily achieved

Structure address assignment should be performed programmatically (i.e. using GIS software applications) based upon the selected addressing system model. The resulting address attribute will be assigned to both the structure and access point features maintained in the GIS database.

Address Notification

Address notification should begin with a public relations effort including press releases and photo opportunities. The public relations effort, initiated at the start of the project, will help to inform the citizens of the pending address changes, how the changes will be implemented, the implementation schedule, and the long-reaching benefits of the program.

Following the initial public relations effort and after the mapping and road naming tasks have been completed, address notification should commence. Address notification packets will be hand delivered to every addressable structure within Bath County. Each packet should include the new address, an informational letter from the County, and instructions for returning their current address information.

Address notification packets should be coded with a unique tracking number that is linked to the addressed structure feature maintained in the GIS database. This unique number is a simple tool that, when properly deployed, greatly enhances the efficiencies and accuracies with which the addressing and notification process, and cross-referencing tasks can be completed. Using tracking numbers provides the ability to pinpoint those residents who have not responded to the address notification packet at any given time throughout the project. This enables the County to target further public relations and re-notification efforts.

Road name signs

To ensure a complete Mapping and Addressing Program, street name signs will need to be manufactured and installed on public and private roads. In addition, the County may elect to place address placards at the ends of driveways. In support of this Program component, The County will need to rely on coordinated activities with the Country's selected sign manufacturer.

MASTER STREET ADDRESS GUIDE (MSAG) DEVELOPMENT

Old to New Address Cross Reference

As the County citizens and businesses respond to the address notification packets (through call-in or mail-in), an old to new address cross-reference database will gradually be created. This database serves as the foundation of the project's records cross referencing (telephone companies and post offices) and Master Street Address Guide development tasks. The following information is provided by the residents / businesses, and recorded in the database:

- Name of caller (first, middle, last)
- Business name
- Phone bill information (first, middle, last)
- Newly assigned E-911 address
- Old / Current mailing address
- Post office
- Zip code
- Telephone numbers (phone, fax, modem)
- Landlord information (first, middle, last, mailing address, phone number)
- Tracking number

Ideally, this information is entered into tabular database that is linked to the GIS database.

Telephone Number to Address Cross Reference

With the way the old to new address cross-reference information is collected, it is relatively easy to create the telephone number to address cross-reference. In fact, depending upon the success of the citizen call-in / mail-in process, a significant portion of this cross-reference is developed as a direct by-product of the old to new address cross-reference.

The telephone number cross-reference will require "scrubbing", or validation between Telephone company records and information collected from the citizen cross reference database compilation efforts. Ultimately, the E-911 component will not be considered complete and updated until a minimum 98-percent match rate is achieved between our records and the records of all LECs.

Emergency Service Zones and Other Overlays

Emergency service zone (ESZ) locations should be accurately mapped in the GIS database. The address and telephone number cross-reference databases are then linked to the GIS roadway and structure location database. Together, this information is used to create the Master Street Address Guide. This automated process is made possible through the deployment of a front-end GIS solution, providing the ability to perform a point in polygon query to assign ESZ numbers to every telephone number within Bath County.

Address Maintenance

The development of a GIS address maintenance application is critical to the continued success of the planned E-911 Mapping and Addressing Program. Bath County estimates that they currently have about 50 new residential and business structures annually. Two options are available to provide the necessary addressing maintenance support, In-house maintenance and contracting through a vendor.

In-house Addressing Maintenance

Bath County will require a GIS based address maintenance application customized to meet the Program's specific addressing requirements. This application will provide County employees with the ability to intuitively map new structure locations and programmatically assign new addresses through a standard Windows desktop environment.

Contracted Addressing Maintenance

Bath County can elect to have a qualified vendor provide addressing and road centerline maintenance services. The County would provide the vendor with the location of the new structure and access point. The vendor would return a new address and update the GIS with the structure point, access point, and new addressing information. The entire addressing process normally takes 1 business day. The frequency of updates will depend on County development activity.

COMPUTER AIDED DISPATCH INTEGRATION

Currently, the County's intent is to ensure that all Mapping and Addressing digital product deliverables are in a format that can be passed through to the selected Computer Aided Dispatching software (future). To that end, data provided to the County will require to be non-proprietary in nature. This will ensure a seamless integration with most commercially available Computer Aided Dispatching packages on the market today.

SECTION 8 – RECOMMENDATIONS – PSAP EQUIPMENT

INTRODUCTION

The PSAP Customer Premises Equipment (CPE) consists of several components or modules that together provide the functionality to handle 911 and E-911 requests. Bath County requires a significant improvement of their current PSAP CPE to enable E-911 call processing.

We consider the following key elements when making PSAP CPE equipment recommendations:

- Equipment and software that will meet the current need and have the flexibility to handle the future communication needs. The demands on equipment and software are changing as new technologies such as wireless communications and location-based services are entering the market. Equipment should be based on industry standard workstations and servers. Software should be modular in nature and be based on open architecture.
- Built in redundancy and backup to minimize failure and enable a quick recovery. Critical system components should have a primary and backup operation capability. The PSAP should have a minimum of two dispatch consoles. This provides the redundancy should one console fail. Two communications links are recommended between the PSAP and the tandem office to provide redundancy and reliability. An uninterruptible power source (UPS) should be provided for all critical equipment, including the ANL / ALI, dispatch consoles, and network switches, to enable the PSAP operation while the auxiliary power is being engaged.
- Vendors who provide industry leading equipment and software. CPE should be acquired from a vendor that has a proven success record and one that will be around to provide service and support. This necessitates choosing a vendor with the best long-term value, not just the lowest initial price.

There are several qualified vendors that the County can select to provide the CPE. TIMMONS has experience working with Plant Equipment, Inc. Plant is well regarded in the emergency services industry, is an ESRI business partner, and has a large install base in Virginia. TDS has a value added reseller arrangement with CML, Inc. They should be considered as an alternative to Plant, should the County desire.

Based on our experience and references TIMMONS recommends that Bath County use equipment and software from Plant Equipment, Inc. Plant is an industry leader and has one of the largest install bases in Virginia. Plant CPE is modular in nature. This enables the PSAP to expand, as the county needs demand. The following recommendations are based on the Plant Equipment components. Since this is a competitive market we believe that the pricing will be similar regardless of the system chosen.

PSAP RECOMMENDATIONS

ANI/ALI Retrieval System

The system is based on the Plant MARRS, Modular ANI/ALI Retrieval System, (ANI / ALI controller) with VESTA workstations (dispatch consoles). The MARRS system is equipped for four wireline trunks and one multi-line trunk Card. MARRS serves as the foundation for a 911 system. It performs tasks such as interfacing with the 911 trunks through the trunk interface unit, initiating ALI requests through the data base unit, performance monitoring through the remote maintenance unit, call recording through the call record unit, CAD interface through the CAD unit, and status reporting through the status reporting unit.

Dispatch Console

We recommend two VESTA and ComCentrex console positions. The call volume does not require both positions to be active and manned at all times. However, they do provide the desired redundancy and reliability. The VESTA is a PC based workstation with 18" screen that provides integrated telecom and ANI/ALI display capability. The VESTA system is equipped for TDD and provides interfaces to the radio system and CAD system. VESTA has a complete suite of standard features including: TTY, IRR, ANL/ALI with Lat/Log display, pre-recorded greeting, auto-dial, call control, call-notes, call-status, call playback, and ANL callback.

ALI Database

The ALI database works in coordination with the other CPE equipment to provide location information including the address and other structure related information. The ALI database will be initially loaded as part of the addressing cross-reference process. Once developed and implemented, TDS Telecom will provide updates to addressing and phone number information.

The ANI / ALI controller can be programmed to use a local, remote, or combination of both for accessing ALI database. A local only ALI database will support wireline E-911 calls. Redundant links to a third party ALI database are required for Phase I wireless E-911 call support.
The selection of local or remote ALI database is dependent upon the ability of TDS to provide the remote service, the ability for TDS to provide connectivity to another third-party ALI service (Intrado, TCS, Verizon). TDS representatives are currently working on providing answers to this question.

Power Backup

The system should have a UPS capable of supporting the MARRS, VESTA workstations, and network switches for up to 30 min. This insures continued operation during momentary power brownouts and bridges the time while the auxiliary power is brought on-line.

SECTION 9 – RECOMMENDATIONS – NETWORKING

INTRODUCTION

A computer network capable of supporting wireline E –911 including the ANI / ALI retrieval system, dispatch workstations and, management station(s), is required for the efficient use of the system. This network will also provide future connectivity to the GIS data.

NETWORKING COMPONENT RECOMMENDATIONS

We recommend a basic switch network for the PSAP and Sheriff's office. Described below are recommendations on the specific network components.

Network Cabling

We recommend category 6 cabling network drops for each workstation location and each printer/plotter. Additional cable drops can be provided as the network needs expand. We anticipate 5 network drops as shown below:

- ANI/ANL controller
- ALI server (assuming local ALI support)
- Dispatch Workstation 1
- Dispatch Workstation 2
- Management station (future)
- Printer

Output Device Connections

1 single port Jet Direct 100MB box for the printer - This connects the printer directly to the network. This connection method decreases the total time it takes to get a paper report or map, does not impact the efficiency of any workstation, and provides the flexibility to locate the devices anywhere in the office area.

Network Cards

Network cards are devices that are installed in each computer to provide network access. Network cards are included as part of the CPE. Some additional network cards may be required to add additional existing workstations to the network in the future. Additional cards should be 10/100 cards.

Network System Rack

A systems rack organizes the switch and patch panel described below. Using this reduces the cost of maintenance over time. All connections are neat, labeled and accessible.

Patch panel

The patch panel is used to centralize network drops. Provides a central location for all cable hookups.

Network Switch

One 24-port Cisco Catalyst 2900 10/100 switch this provides the interconnectivity between workstations, other networks, and output devices. We have specified a switch with sufficient capacity to handle the current and planned networking connection needs.

SECTION 10 – RECOMMENDATIONS – PERSONNEL / TRAINING

PERSONNEL

The current staff within the Sheriff's office consists of 17 officers, including the Sheriff. Of these 6 are designated as dispatchers. The most common question among PSAP administrators is, "How many dispatchers do I need?"

With the call volume and the number of consoles established, it is recommended that the current staff of 6 dispatchers will be adequate. This determination is based on the simple fact that you need one full-time person to fill each position, plus some fill-in positions (another shift, part-time worker, etc.) to staff that full-time person's days off, vacation and other leave. This "vacancy factor" has been standardized in the private sector as .7, thereby making the number of persons to fill one full-time position as 1.7. Utilizing this formula to analyze Bath County's needs generates a formula of 3 *(one station * three shifts)* * 1.7 *(vacancy factor)* = 5.1. This justifies a recommended staffing level of 6 dispatchers.

TRAINING

Public Safety Dispatchers receive and respond to citizen's calls for service, both emergency and non-emergency, and dispatch police officers, firefighters and equipment to handle any type of situation. PSAP personnel provide the vital first-link between citizens and the county's resources. Their performance directly contributes to the safety and well being of the emergency services workers and the county's residents.

The intent of a training program is to familiarize the dispatcher with the County and teach them the technical skills for properly performing the job. It is recommended that Bath County develop a comprehensive E-911 training program to train new dispatch staff and provide refresher training to existing staff. This program should address industry standard training for PSAP dispatchers and managers. NENA offers guidelines and recommendations for a professional and certified training program.

In addition to industry standard dispatcher training, the selected vendor for the PSAP CPE should offer training focused on the equipment use and maintenance. Most manufacturers offer comprehensive training courses in the operation of their equipment. This training covers the normal operation and maintenance of the PSAP equipment. It is highly recommended that the selected vendor be required to provide a full curriculum of administrator and end-user courses that educate the staff and get them comfortable with using the new systems and technology.

SECTION 11 – FINANCIAL REPORTING

CURRENT COSTS

Bath County currently has an average estimated monthly recurring cost for the PSAP of approximately $283. This estimate is based on the following factors:

- Current dispatch staff compensation
- Switching charges from the LECs serving the County
- Telecom costs for 911 services are not separated from the other telecom costs.
- There are no equipment maintenance contracts resulting in recurring costs

Compensation for the dispatchers and related personnel are currently not assigned as a separate budget line item in the Sheriff's Office budget. Information is not currently available on the portion of time spent on PSAP related activities vs. other duties. To arrive at a monthly estimated salary cost we used the average salary of the six Bath County dispatchers, which is $22,300, and added a 50% multiplier for benefits and overhead allocation, to arrive at an annual cost of $33,450 per dispatcher. This makes the total annual cost $200,700 for six dispatchers, which calculates into a monthly estimated salary expense of $16,725. The Virginia Compensation Board currently provides funding assistance to the Bath County Sheriff's Department. This funding is, however contingent upon state budgetary situations.

This cost is a total of the charges incurred from each of the 4 LECs in the County for switching 911 calls to the 7-digit protocol required by the current PSAP system. These costs are broken down as follows:

TDS Telecom	$38
MGW (Mountain Grove – Williamsville)	$23
Verizon	$83
CFW nTelos	$139
Monthly Recurring Costs	$283

Item	Cost Estimate
Average switching costs from LECs	$283
Total Monthly Recurring Costs	**$283**

RECOMMENDED - NON- RECURRING COSTS

Non-reoccurring costs for wireless E-911 include fees associated to PSAP hardware and software acquisition, providing connectivity between the PSAP and Call Center, and preparing the County for E-911. Details of the task items included in each of theses categories are shown below. The costs provided are estimates based on providing the scope of services described in this document. Actual costs will be dependent on negotiations for products and services with the specific vendors.

Item	Source	Cost Estimate	Total
PSAP Hardware & Software	Plant Equipment	$170,000	$170,000
Telco Installation and Cutover	TDS Telecom	$12,000	$12,000
County Preparation			$252,000
Road Naming & Addressing	TIMMONS	$182,000	
Street Signage	VDOT/Vendor	$70,000	
Total Non-reoccurring costs			**$434,000**

RECOMMENDED - MONTHLY RECURRING COSTS

Recurring costs are those costs associated with the operation and maintenance of the PSAP facilities. This includes monthly call center telecommunication charges, LEC switching charges, CPE equipment maintenance costs, personnel costs, and training updates.

This estimate is based on TDS providing CAMA trunk lines from the Warm Springs CO to the PSAP. They anticipate providing connectivity through dedicated full T-1 lines. Salaries included in the table below are currently funded through the Sheriff's annual budget. No information is currently available on the portion of time spent on PSAP related activities vs. other duties. To arrive at a monthly estimated salary cost we used the average salary of the six Bath County dispatchers, which is $22,300, and added a 50% multiplier for benefits and overhead allocation, to arrive at an annual cost of $33,450 per dispatcher. This makes the total annual cost $200,700 for six dispatchers, which calculates into a monthly estimated salary expense of $16,725.

Item	Cost Estimate
Tandem Trunk Lines	$1,200
7 Digit call switching (all providers)	$283
Salaries (Director and Dispatchers)	$16,725
Capital Equipment	$200
Office supplies / Equipment	$100
Total Monthly Recurring Costs	**$18,508**

RECOMMENDED - LIFE CYCLE COSTS

Costs we include in this section are associated to the support and maintenance of the CPE equipment and the county structure addresses. The structure addressing cost is based on contracting with a vendor to provide the support services. This is the most cost efficient approach for addressing maintenance, based on the volume of yearly address changes and availability to qualified human resources.

The initial equipment purchase price includes support and maintenance for 1 year from the date of purchase. Maintenance is priced on a per seat basis and covers all materials, labor and system software upgrades. CPE maintenance provides service 24 hours a day, 7 days a week, 365 days a year.

Item	Annual Cost Estimate
Maintenance & Support Plant system	$60,000
Addressing and Road centerline maintenance	$5,000
Annual Life Cycle Costs	**$65,000**

It must be noted that these life cycle cost estimated do not reflect major equipment upgrades or replacement as may result from technological advancements, etc..

Financial Impact of Wireless Phase I

Additional Funding Available From the WSB for Wireless Phase I

- The following list is subset of the items eligible for funding by the Wireless Services Board under the wireless phase I funding guidelines. This list is based on the additional items that are not in the current proposal and would be required to implement wireless phase I services.

- Digital voice logging software (subject to the % of wireless vs. non wireless phone calls or minimum 10.42%)
- Call Accounting software 100% funded by the WSB
- PSAP Personnel. (Subject to the % of wireless vs. wireline phone calls or minimum 10.42% or $30,000 which ever is greater
- CPE system maintenance (subject to the % of wireless vs. non wireless phone calls or minimum 10.42%)

Additional Costs For Wireless Phase I

To make the proposed system wireless phase I ready, we propose the addition of digital voice logging equipment and call accounting software to keep track of the wireless and wireline calls.

Plant Equipment provides these capabilities through their Magic call accounting system and their Pyxis Digital recording system. Magic collects call data, telecom, and agent data allowing administrators to generate comprehensive reports that help schedule, plan and

anticipate call-center needs. Magic can generate a variety of standards and custom reports on single call events, individual or trunk and line groups, or agent/console performance.

The Pyxis system is a 12-channel voice logging system. This system integrates the other CPE components. This call recording equipment is used to record log and organize calls processed through the PSAP.

The State Wireless Services Board will provide a funding toward the local cost (cost minus the comp. board funding) of personnel. This funding is based on the proportion of wireless to wireline E-911 calls, with a minimum of $30,000 or 10.42%, which ever is greater. The eligible personnel costs include:

- Salary and benefits of call takers (full or part time)
- Salary and benefits of the PSAP director or coordinator provided they do not have other responsibilities.
- Salary and benefits of a training coordinator
- Any training costs incurred by the PSAP associated to handling wireless E-911 calls.

Item	Frequency	Cost Estimate	
Digital voice logging equipment to handle E-911 calls *	Non-recurring	County	$24,187
		WSB	$2,813
Digital voice logging maintenance	Annual	County	$5,400
Call Accounting software purchase	Non-recurring	WSB	$36,000
Plant CPE equipment maintenance	Annual	WSB	$ 6,252
Personnel Costs *	Annual	WSB	$30,000

* (Total price - 10.42% minimum proportion of wireless to wireline calls)